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# PHILOSOPHICAL TRANSACTIONS.

Monday, October 21. 1667.

## The Contents.

*An Account of more Tryals of Transfusion, accompanied with some Considerations thereon, chiefly in reference to its Cautious Practise on Man ; together with a farther Vindication of this Invention from Usurpers. The Method of Transfusing into the Veines of Men. Answers to some of the Inquiries formerly publisht concerning Mines. An Extract of a Letter sent from Paris about the Load-Stone ; where chiefly the suggestion of Gilbert touching the Circumvolution of a Round Magnet, and the Variation of the Variation is examined. An Account of some Books and small Tracts : I. FREE CONSIDERATIONS about SUBORDINATE FORMS, by ROBERT BOYLE Esquire. II. JOH. SWAMMERDAM, M.D. de RESPIRATIONE & USU PULMONUM. III. OBSERVATIONS faites sur vn RENARD MARIN, & vn LYON, à Paris. IV. HISTORIA AMBRÆ GRISEÆ, Auth. JUSTO KLOBIO, D.*

### *An Account*

*Of more Tryals of Transfusion, accompanied with some Considerations thereon, chiefly in reference to its circumspect Practise on Man ; together with a farther Vindication of this Invention from Usurpers.*

**T**HIS Experiment, as it hath raised Disputes among the Curious both here and abroad ; so it hath put some of them upon considering such ways, and given such cautions, as may render

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der the use of it safe and beneficial. Of the number of these seems to be that *French Virtuoso, Gasper de Gurje de Montpoly*, who in a late *Letter* of his to Monsieur *Bourdelot*, declares to the World, that this is a very Ingenious Invention, and such an one, as may prove very useful ; but withall, that, in his opinion, it is to be used with much caution, as not being like to be practised innociously, it imprudent men do mannage it, and the concurrence of two differing sorts of Blood requiring many tryals, and a careful observation of many circumstances, to give assurance. He supposes, that the Blood of every Animal is endowed with its peculiar Temper, and contains in the Aggregate of its parts, different natures, principles, figures, and even a different Center. Whence he concludes, that two Substances thus differing, and containing plenty of Spirits, are not reducible to one and the same Center, nor to one and the same Body without *Fermentation* ; and that this Operation may prove of danger to him, that shall have admitted into his Veins a strange Blood (wont to be free in its native Vessels) without passing through those degrees, that must give it Impressions suitable to the temper and functions of the Vitals of the *Recipient*: And taking for granted, that no considerate man will hazard a *Total* Transfusion, he acknowledges that a *Partial* one may be in some cases and sicknesses very useful, provided, it be practised circumspectly, upon a Body yet strong enough, and in a moderate quantity, so as the Spirits and Blood of the *Recipient* may be able to dissolve and master the transfused strange Blood, and convert the same into its own nature by a gentle *Ebullition* ; to obtain by such a commixture a principle of motion, that may cause a better habit of Body. And he believes, that this *Ebullition* must always happen in Bloods of differing parts and qualities ; and that very hardly two Animals, of differing species, ages and tempers, will be met with, that have Blood so like one another, as not to need *Fermentation*, to make a requisite mixture. He doubts not, that if a substance could be found so resembling that of our Spirits, as that it would immediately unite it self with them, not needing any alteration, the Transfusion of such a Substance would be capable to produce effects little less than miraculous, by relieving the prostrated forces

forces of Nature, and by fortifying in us the Spring of the motion and life : In a word, by exciting that Principle of continual Motion, which, whilst it has strength enough, still subdues and gathers to it self whatever is proper to entertain it, and rejects what is not so. But such an Invention as this he sees cause to esteem very difficult, in regard that *different* Moulds cannot but Characterize things *differently*. Hence he proceeds to the Examples, wherein *Transfusion* hath been experimented, even upon *Men*; alledged in that known ingenious Letter of Monsieur *Denys*. And here he intimates, how much he was pleased to learn, that, according to his Conjecture, a *Moderate* Intromission of Blood hath well succeeded, and the *Fermentation*, which we foresaw would be caused by the commixture of two Bloods, was made with advantage to the Patient: Which he judges did manifestly appear by his Bleeding at the Nose, (a sign of an *Ebullition* made in the Blood :) confirmed to him by this, that an expert Acquaintance of his, transfusing a great quantity of Blood into several Doggs, observed always, that the *Receiving* Doggs pissed Blood.

And as to the other successful Experiment, made upon a healthy and robust man, he notes, that he being a lusty Fellow, stored with blood, and taking the Air, and working hard on the same day that the tryal was made upon him, his vigorous Blood, Spirits, and Constitution, and the strong motion of his Heart, were able to convert into the substance of his own Blood that of the *Lamb* received, and to impart thereto his own nature, and to mould it into Figures sutable to the pores where it was to pass, and proper to the functions it was to perform.

But to these Reflections he subjoyns two other *Instances*, of an unlike success; whereof the one is afforded by a *Man*, the other by a *Dogg*. As to the *Man*; it ought to be related beforehand, to prevent wonder or misconstruction, that his Intestines; when he was opened after death, were found to be gangren'd, and consequently, that then he appeared to have been a subject altogether unfit for this Experiment, seeing it was naturally impossible for him to live with such a putrefaction. But to come to the tryal it self; this *Author* saith, that Baron *Bond*, Son to the first Minister of State to the King of *Sweedem*, undergoing the

\* It were to be wished the *Autor* had expressed the Interval of time, wherein these two Operations followed one another; *that* seeming to be a material circumstance in the Case.

Operation twice, appeared the first time to find new strength by it; but expired soon after the second Operation: \* The Ebullition, it seems, of the corrupt Blood having mastered and enervated all the Blood he had in his Body: which, when open'd, no Blood at all was found in his Heart: probably, as the *Author* conjectureth, upon this account, that there being not left in the *Patient* Blood enough of his own, nor strength sufficient to turn a strange Blood into a substance homogenious to *that*; the Heart was not capable to admit the Blood of the *Emittent*, as consisting of parts disproportionate to his own. But, as hath been already observed, his Entrails were altogether vitiated by a *Gangrene*, and he therefore out of the reach of being relieved by this Experiment.

Concerning the other *Instance*, viz. of the *Doggs*, the *Letter* affirms, that the Tryal was made by Monsieur *Gayen* with great exactness, after this manner. He drew three great dishes of Blood from the Dog that was to receive, and weighed the other Dog that was to furnish; and, the operation being perform'd, he weighed him again, and found him weigh less than he did by *two* pounds; of which having abated an *ounce* more or less, for the Urine, made by the Dog, and an *ounce* or *two* more for the Blood spilt in the Operation, there remaineth at least *one* pound and a *half* of Blood, that was transfused. But, the *Recipient*, though well dress'd, and well fed, died *five* days after, the *Emittent* being yet alive. Whence it seems evident to this *Writer*, that the *too large* Intromission of *new* Blood was predominant over the *Native*, and as 'twere, overwhelm'd it. Whence he again inculcates the dangerousness of infusing *too much* Blood at once, in regard that such Blood being now separated from the principle of life it had in the *Emittent*, and as yet destitute of the stamp necessary to live the life of the *Recipient*, it could not be moved and assimilated by the live Blood, which remained in the *Recipient*; and the *Fermentation*, that was made, passed rather to an Eagerness or Soweriness, than to such an one as precedes Digestion. And this kind of eager acidity *he intimates* was seen by the Spectators, and felt by the Receiving Animal, which

which fswounded, and remained as dead for half a quarter of an hour: And when some alledged, that the Dog died, because he was wounded in the neck, where he could not lick himself, which rendred his wound incureable, answer was given, that Experiments had been made, wherein not only a Vein was opened, but also an Artery, yea, even the *Aspera arteria* cut of a Dog, that could not lick himself, and yet survived.

This whole Account is concluded with an Admonition, that all those, who have conveniency, would make frequent and exact trials of this Experiment on *Brutes*, and carefully observe *Weight* and *Measure*, and all other circumstances, before any thing be hazarded, that may damnify the publick, and depreciate the Invention.

*Abundans cautela non nocet*, is a Maxime very fit to be minded here; though several succesful Experiments have been made in *London*, of very plentiful Transfusions; and among others (to mention a signal one) that upon a *Bitch*, which lost in the operation near 30 ounces of blood, and was recruited accordingly. This Animal does not only survive to this very day, but had another more severe Experiment soon after tryed upon her, by which her *Spleen* was cut out, without tying up the Vessels, whence that *viscus* was separated: Since which time (even before the wound was healed up) she took dog, was with Puppy, and brought forth Whelps, and remains well and jocund, being kept for a piece of remarkable Curiosity in the House of a Noble-man, that is as severe in Examining matters of fact, as he is able in Judging of their consequences.

So that it is not too hastily to be concluded, that *large* Transfusions are dangerous; but rather frequent Experiments should be made, before any thing be therein determined, with great as well as smaller quantities, both upon sound and sickly Beasts, carefully observing, how either is endured in either, and what are the Effects following thereon.

Before we dismiss this *Subject*, something is to be said of the Cause, why the Curious in *England* make a demurr in practising this Experiment upon *Men*. The above-mentioned ingenious Monsieur *Denys* has acquainted the World, how this degree was ventured upon at *Paris*, and what good success it there met with

with : And the *Journal des Scavans* glorieth, that the *French* have advanced this Invention so far, as to try it upon *Men*, before any *English* did it, and that with good success.

We readily grant, *They* were the first, we know off, that actually thus *improved* the Experiment ; but then they must give us leave to inform them of this Truth, that the Philosophers in *England* had practised it long ago upon *Man*, if they had not been so tender in hazarding the Life of *Man* (which they take so much pain, to preserve and relieve) nor so scrupulous to incur the Penalties of the Law, which in *England*, is more strict and nice in cases of this concernment, than those of many other Nations are.

The *Publisher* can assert *bonâ fide*, that several Moneths agoe he saw himself the *Instruments* ready, and heard the *Method* agreed on, thought proper to execute this Operation upon *Man*. And, for further proof thereof, he shall here insert the whole way, peculiarly contrived here for this purpose, by the Ingenious Dr. *Edmund King*, and by him communicated in a Letter ; Monsier *Denys* not having thought fit to describe the *manner* they used in *France* for *Men* ; nor any body else come to our knowledge.

The Letter is as follows,

S I R,

**T**He Method of Transfusing Bloud you have seen practised, with facility enough, from Beast to Beast ; and we have things in a readiness to transfuse Bloud from the Artery of a Lamb, Kid, or what other Animal may be thought proper, into the Vein of a Man. We have been ready for this Experiment this six Months, and wait for nothing but good opportunities, and the removal of some considerations of a Moral nature. I gave you a view, you may remember, a good while agoe, of the Instruments, I think very proper for the Experiment, which are only a Silver Tube, with a Silver Stopper somewhat blunted at one end, and flatted at the other for conveniency of handling, used already upon Beasts with good success. The  
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way is in short this. After the Artery is prepar'd in the Lamb, Kid, &c. let a Ligature be made upon the Arm, &c. of a man (hard enough to render the Vein turgid;) in the place you intend to insert the lesser end of the Silver pipe, which is so fitted, that the Silver Stopper, thrust into the Tube, reaches somewhat, by its blunt end, beyond one of the ends of that Tube. This done, divide the skin of the part in the same manner, that is used in cutting an Issue, just over the vein, to be open'd. Then with a fine Lance open the vein; or, if you please, in case the vein be fair and high (especially if the skin be fine) you may open both together, according to the usual way of letting Blood. Which done, let an Assistant clap his finger, or a little Boulster, prepared before hand, or the like, upon the Vein a little below the Orifice, to hinder the Blood from ascending. Keeping that position, insert the blunt-ended Tupe upwards into the Vein; when 'tis in, hold it and the skin close together between your finger and thumb. Then pull out of the Tube the Stopper, and insert the Pipe, by which the Arterial Blood is to be infused from the Eminent Animal; managing the remainder according to the known Method of this Experiment.

So far this Letter; which maketh the practicableness of this Method look so fair and easie, that nothing seems wanting to encourage the Trial, but the Direction and Assistance of discreet and skillful men, taking care, not to experiment it upon Subjects, that have their internal parts vitiated; for as much as it seems not reasonable to expect, that this Transfusion should cure *Cacochymies*, or restore a depraved constitution of the *viscera*.

We would have said no more of this Argument at this time, were we not obliged to remove a mistake found in one of the late French Journals, affirming with confidence, that 'tis certain, the  
French



*French* have given the *English* the first *thought* or notion of this Experiment. And why? because (*say they*) they are witnesses, that a *Benedictine* Fryer, one *Don Robert de Gabers*, discoursed of it at *Monsieur de Monmors*, ten years agoe. Surely, all ingenious men will acknowledge, that the *certain* way of deciding such Controversies as these, is a Publick Record, either written or printed, declaring the time and place of an Invention first proposed, the contrivance of the Method, to practise it, and the instances of the success in the Execution. All this appears in the field for *England*.

*Numb. 7.* of these *Transactions* (printed *An. 1665. in Decemb.* acquaints the World, how many years since *Dr. Christopher Wren* proposed the Experiment of *Infusion* into Veins. And this was hint enough for the *R. Society*, some while after to advance *Infusion* to *Transfusion*, for the trial of which latter, they give order at their Publick Meeting of *May 17. 1665.* as may be seen in their *Journal*, where 'twas registred by the care of their Secretaries obliged by Oath to fidelity: The trials proving *then* lame, for want of a fit *apparatus*, and a well contrived *Method* of operation, the Learned Physician and Expert Anatomist, *Dr. Lower*, since found out such a Method, which is not only registred in the same Book, but also published in Print *Numb. 20.* of these *Tracts*, before which time it had been already practised by the said *Doctor* in *Oxford*, who was followed by several ingenious men at *London*, that successfully practised it by the Publick Order of the aforesaid *Society*.

It seems strange, that so surprizing an Invention should have been conceived in *France*, as they will have it, ten years ago, and lain there so long in the Womb, till the way of Midwiving it into the world was sent thither from *London*: To say nothing of the disagreement, there seems to be about the French *Parent* of this *fetus*, *Monsieur de Gurye* in the Letter above mentioned, fathering it upon the *Abbot Bourdelot*, but the Author of the *French Journals*, upon a *Benedictine Fryer*.

But whoever this Parent be, that is not so material, as that all that lay claim to the Child, should joyn together their endeavours and cares to breed it up for the service and relief of humane life, if it be capable of it; and this is the main thing aimed at and sollicitd in this Discourse; not written to offend or injure any,

any, but to give every one his due, as near as can be discerned by the *Publisher*.

### *Answers*

*To some of the Inquires formerly publish'd concerning Mines.*

**T**Hat the *Queries*, scattered up and down in these *Traëts*, may not seem lost, or left un-regarded, the *Publisher* intends to impart at convenient times such of the *Answers* shall be sent in by observing men, as may be thought acceptable to the *Reader*.

He begins now with an Account, communicated to him by the Learned and Inquisitive Mr. *Joseph Glanvil*, who premises in a *Letter*, that he procured the following *Answers* from a person living near the *Mendip-Mines*, and upon whose relations we may securely depend: Adding, that he does not by these few suggestions think himself absolved of his Taske, but shall pursue the matter farther, as soon as he has an opportunity of going into these Parts, whence he expects to be farther inform'd.

The *Reader* will be pleased to look back to the said several *Queries*, as they are extant in the *Number 19*; the following *Answers* respecting thither, and being accommodated to the Mines of *Mendip* in *Somerset-shire*, where the following Observations were made; *viz.*

To the 1, 2, 3 *Queries*. That all *Mendip* is Mountainous, yet the Hills not equal in height. That it is barren and cold, and rocky, in some places. That the Ridges thereof run confusedly, but most *East* and *West*, and not in any *Parallel* one with another. That upon the *Surface* thereof it is Heathy, Ferny and Furzy; and the Cattel, it feeds, for the most part are Sheep, which go there all the year; and young Beasts, Horses and Colts at Spring and Fall. That the Sheep are not fair, but big-bellied, and will grow to no bigness, after they have been there fed; but will grow fat, if they are removed into better soyle, and so their Beasts and Horses.

To the 4, 5, 6, 7 *Queries*. That the Natives and Inhabitants  
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